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HEALTH & MEDICINE

On Driving SARS-CoV2 Extinct

Why We Need a Multi-Pronged Approach

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JUL 30, 2021

This article is co-authored by Heather Heying and Bret Weinstein. It is very long, and sometimes technical, and not as much fun as a lot of what will be showing up in Natural Selections in the future.

Author's Note, January 2022: We stand by the scientific research and analysis presented in this article, but have, for many months now, seen the eradication of SARS-CoV2 as an impossibility. That ship has long since sailed. The authors disagree slightly as to whether it was indeed ever possible. Now that we have Omicron, however, and the threat from this virus is thus much reduced, making early treatment available to everyone, and fully opening up our economy and, most importantly, our humanity, is paramount.

We are at a crossroads. There is a deadly virus circulating and out of control. Many have died, and many more certainly will. We can choose to use all available tools to eradicate

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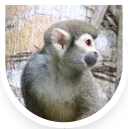

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e disagreement along the way.
l Quillette article, see one and only one way forward: vaccination of every person with access to currently authorized vaccines. Other people, including ourselves, believe that the current vaccines—which are non-sterilizing, cannot quickly reach the entire world, and provide only narrow, short-lived immunity—cannot accomplish the goal, not even in principle. Any viable strategy for extinguishing SARS-CoV-2 in the near term must therefore include effective prophylaxis beyond the current crop of authorized vaccines. For now that means drugs taken to prevent infection for those who are unvaccinated and who have not had a confirmed case of Covid (and therefore lack natural immunity). It may also require prophylactic medicine for vaccinated people as fading vaccine-induced immunity and new variants evolving in response to the vaccination campaign render the current vaccines ever less effective.

This is a departure for us, running exactly counter to our typical expectations. Ordinarily, we are enthusiastic about vaccines and decidedly skeptical about pills. On this issue though, with these vaccines, our position has flipped. There are several reasons for this: the novel and non-sterilizing nature of the vaccines being deployed, the potential for perverse incentives involved in a vaccine only strategy, emerging concerns about vaccine safety, and the logistical reality that vaccines alone cannot, and will not,

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This reasoning is discussed in episode #87 of our podcast.

Our position is very simple, but not simplistic, as those who caricature us would have you believe. We are neither knee-jerk opponents of the Covid vaccines, nor knee-jerk supporters of promising repurposed drugs like ivermectin. We want access to data and evidence with which to scientifically assess the situation, rather than pre-digested bytes of politically-motivated conclusions that serve to polarize rather than inform. Our simple position is this: we advocate using every sufficiently safe tool at our disposal to drive Covid-19 to extinction, whether it is profitable or not. The alternative to success is unthinkable, and we cannot fathom a reason not to wield all useful weapons in this fight. The clear failure of informed consent, and a pharmaceutical safety system riddled with perverse incentives, is our chief complaint.

Regardless of where you land on issues of vaccines and prophylactics, we should all be unified in the goal of eradication, and to that end the public deserves to be party to open, transparent, and honest scientific discourse regarding this virus and our way through it. In pursuit of that goal we have worked diligently throughout the pandemic to communicate what we know, what we think we know, and where we think the public is being misled. We have also been careful to correct our own errors when we have made them.

Those who have followed us have been far ahead in recognizing the potential utility of masks in preventing infection, the recognition that outdoor environments are safe and protective from Covid, the importance of vitamin D and the hazard of D deficiency (for people living at high latitudes, for example), the hazard of enclosed spaces and virally saturated air, the hazard of obesity and other co-morbidities, the narrowness of vaccine-induced immunity compared to the robust immunity generated by infection, the long term danger of Covid even in those with few symptoms, and the possibility that vaccines and relaxed safety standards would together select for viral variants that would increase the risk of breakthrough cases.

The article that follows is in keeping with our mission of following evidence and deriving robust conclusions, even when that puts us at odds with the current

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We invite skepticism. In fact, we require it. It is an essential mechanism for challenging ideas, identifying errors, and furthering collective knowledge.

Organization of this Essay

We have come under intense fire of late, not only for our logic and science—our motives and ethics have also been impugned. We feel that these critiques are not just uncareful and unjustified, but ominous and ultimately counterproductive to overcoming the immense challenges that we face. We are motivated by a strong desire to minimize human suffering from Covid, as we know are many of our critics. That is defense enough for what we are attempting to do. We disagree with our critics on the interpretation of the available evidence and are making a case that the conventional wisdom is wrong. Not only is that morally defensible, it is morally required. And the degree with which our most prominent critics have transparently stumbled in responding to us is a powerful evidence that what we are told is "settled science" is anything but.

The first draft of this essay responded to many of the inaccuracies in the Quillette article (Berlinski and Deigen 2021). In the intervening weeks, however, we have opted to instead focus on defending science and reason, because in the end, this is what really matters. As we have removed many, but not all, of the explicit corrections to that essay, the new organization bears explanation.

Our stated goal is to figure out how best to eradicate SARS-CoV2. We will not review here public policy regarding lockdowns and other travel restrictions, mask mandates, or any but one of the repurposed drugs that are under consideration as prophylaxis against Covid.

Rather, we are going to focus on the effectiveness and safety of only two preventative measures: ivermectin, and (Covid) vaccines, specifically mentioning that evidence which

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effectiveness of ivermectin as prophylaxis against SARS-CoV2. We will largely avoid discussion of the use of ivermectin as *treatment* for Covid, although there is substantial evidence that it does reduce the severity of disease, especially when given early in the course of infection. Many of the non-scientific texts written about ivermectin, including the Quillette article, seem to conflate prophylaxis and treatment, a sure sign of sloppy thinking.

Second, we will look at the safety record of ivermectin. Third, we will look at the safety of the Covid vaccines. And fourth, we will look into the effectiveness of the Covid vaccines.

Fifth, we will discuss the natural immunity that is obtained from having had Covid itself.

Sixth, we will discuss the politicization of several aspects of this discussion, which leads to our Seventh section, in which we speak to the use of fear and bad math employed by some of our critics. Here we will also point to just a very few of the additional errors in both the Quillette article and Making Sense podcast episode #256 with Eric Topol, to point to the difficulty of making clear and coherent arguments in a context dominated by misinformation.

With respect to defeating Covid, we are all in this together. We would ask, whether you are a critic or a supporter, that you always keep that in mind.

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1) *Effectiveness of ivermectin as prophylaxis*

a) Meta-analysis:

The most recent meta-analysis of the efficacy of ivermectin as both prophylaxis and treatment (Bryant, Lawrie et al 2021) has come under much fire. With regard to prophylaxis only, the authors included three Randomized Controlled Trials (evidence that is not in the form of an RCT is not included in a meta-analysis). Their overall assessment of the evidence was that it was of "low-certainty" due to limitations in the study designs and low number of included trials (see their table 4 and figure 15). And yet despite these weaknesses in the available research, the authors found that "ivermectin prophylaxis reduced COVID-19 infection by an average 86% (95% confidence interval 79%–91%)."

One of the three papers included in the meta-analysis has since been withdrawn (it was still a pre-print, so "withdrawn" rather than "retracted"). When that paper is removed from the meta-analysis, the confidence interval for the effectiveness of ivermectin as prophylaxis grows—as we would expect when data are removed from an analysis—but the average effect remains essentially the same (up 1% point to 87%).

With regard to the overall quality of the meta-analysis, Berlinski and Deigin, in their Quillette piece, dismiss it solely on the basis that another paper describes it as of "critically low quality." This other paper, a never-to-be-peer-reviewed report put out by the Scientific Advisory Group of the Alberta Health Services, employs an analytical tool that was never intended to generate such a conclusion (see Shea et al's highly-cited 2017

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we suggest that it is the criticism of the meta-analysis that is of critically low quality, rather than the meta-analysis itself.

b) Health care workers in Argentina:

In a study of 1,195 health care workers in Argentina, 788 were put on a combination of ivermectin and carrageenan as prophylaxis, and 407 were not, instead using only PPE (personal protective equipment). For this observational, non-randomized trial, health care workers were recruited from four major hospitals in Argentina. Ivermectin was given weekly; carrageenan (an extract of seaweed) 4x daily. Of those on ivermectin and carrageenan, nobody came down with Covid. Of those not on ivermectin, 58% (237 of 407) got sick.

If this result is true, it strongly supports the case for ivermectin as prophylaxis. It is of course possible that the strength of the effect is partly due to the carrageenan nasal spray, which is not likely to be practical on an ongoing basis, but could well be used as a supplement for instances of particular viral danger.

It is, of course, possible that the research is fraudulent, as the authors of the Quillette piece imply without saying the word fraud, or offering any evidence. Effectively, their argument is that the result is too good to be true. The logic appears to go something like: "If this were true it would be amazing, but because we have already decided that amazing isn't possible, this can't be true." They seem to have dismissed the research because it doesn't fit their preconceptions, not on the basis of evidence. (We also wonder if the authors would be equally eager to apply their "smell test" rubric elsewhere, as with this study of Merck's new anti-Covid drug which showed 100% effectiveness in ferrets.) Should the public, perhaps, have made this argument about penicillin, or in fact about vaccines in general? Two things that were surely "too good to be true." Disbelief does not constitute evidence.

Some critiques of this work have been raised that are worth considering. These results demand a follow-up: another study. The cost of an out-of-hand dismissal of any

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[Editor's note: As we spoke about on our podcast on August 28, since shortly after publishing this post on July 30, Bret has been seeking the original data set for this study, hoping to resolve ambiguities raised above and by others. As of September 3, however, the data set has not been provided, leading us to give the study zero weight. We hope that the data set will emerge.]

c. *Pre-existing ivermectin use in Africa:*

Throughout Africa, mass prophylactic administration of ivermectin as a protection against a variety of parasitic infections, including filariasis and onchocerciasis, is common. It is not, however, ubiquitous, which provides a kind of natural experiment. If ivermectin is an effective prophylaxis against Covid, we should expect to see lower rates of Covid in those countries which mass administer ivermectin prophylactically, than we do in those countries which do not (we discussed this in livestream #80 of DarkHorse).

Two sets of researchers approached this question independently, and came up with very much the same answer: In those African countries whose people were already on prophylactic regimens of ivermectin before the pandemic, the incidence of infection with SARS-CoV2 was lower than in those African countries with no preexisting ivermectin prophylaxis protocol (Guerrero et al 2020, Hellwig and Maia 2021). As the latter state in their abstract:

> "Here, we show that countries with routine mass drug administration of prophylactic chemotherapy including ivermectin have a significantly lower incidence of COVID-19. Prophylactic use of ivermectin against parasitic infections is most common in Africa and we hence show that the reported correlation is highly significant both when compared among African nations as well as in a worldwide context."

d. *Ivermectin roll-out in India, and elsewhere:*

Similar kinds of evidence can be found in India (we discussed this in DarkHorse

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distribute ivermectin (e.g. Uttar Pradesh), versus those states that do not (e.g. Maharashtra). This is not peer-reviewed work, but rather graphs compiled by data scientist Juan Chamie, using publicly available data at api.covid19india.org. Most recently, Chamie reports that Uttar Pradesh, with an active ivermectin distribution program and 17% of India's population, had <1% of cases nationwide, and 2.5% of deaths in the last 30 days. In the same time period, Maharashtra, which uses ivermectin far less, and has 9% of the country's population, had 18% of nationwide cases, and 50% of deaths. In summary: an Indian state with an active ivermectin program had far fewer cases and deaths than expected given its population; a state with a less aggressive ivermectin program had far more.

That said, the state of Maharashtra filed an action with the Mumbai high court to add ivermectin (and vitamin D) as prophylaxis against Covid, but the government replied that because ivermectin is already listed under the treatment protocol, no change is warranted. This suggests a critical misunderstanding of the difference between prophylaxis and treatment.

While hardly a traditional scientific approach, scrolling through Chamie's twitter feed (or going to his website) reveals ever more evidence of a similar sort: the Indian states of Karnataka, Uttarakhand, and Goa all showed precipitous declines in cases and fatalities after the widespread adoption of ivermectin. The same is true in Panama and Mexico. And in a comparison between Delhi and London, both of which are battling the delta variant, and which had an identical number of cases per capita on June 1, Delhi—using ivermectin—showed an 88% drop in cases by the end of June, whereas London—using vaccination—showed a 392% increase.

If the only evidence we will accept is large scale Randomized Controlled Trials, the deck is inherently stacked against older, better understood drugs due to the massive expense of such studies—a cost borne by manufacturers who for obvious reasons prefer to run trials on drugs that might make money. One solution in this case would be to take advantage of the fact that ferrets, which have similar ACE2 receptors to humans, contract and transmit Covid when in close contact, just as the Molnupiravir trial above did. Prophylactic ivermectin could be tested in ferrets comparatively cheaply.

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meta-analysis of RCT's, health care workers in Argentina, pre-existing chemo-prophylaxis with ivermectin across Africa, and roll-outs of ivermectin in several Indian states. Even the Wall Street Journal has published an op-ed with reference to further evidence of its effectiveness. Is it possible that all of these disparate sources of signal are wrong? Yes it is. But when multiple kinds of evidence converge on a pattern, that means more than when only one kind of research repeatedly finds the same thing. We have nothing to lose by taking this evidence seriously and pursuing a greater understanding of ivermectin. We have a very great deal to lose by failing to do so.

2. Safety Record of Ivermectin

Ivermectin, due to its efficacy against a broad range of pathogens and parasites, has been deployed across continents under myriad conditions, and has a decades-long safety record. It is on the WHO's list of Essential Medicines, which the WHO describes as a "core list... of minimum medicine needs for a basic health-care system, listing the most efficacious, safe and cost–effective medicines for priority conditions."). It has saved countless lives, and restored the lives of many more to health.

Here is a paragraph from a well-respected team of scientists, published in 2010 (Chaccour et al 2010; we have left in their originally numbered references, hot linked to the primary sources):

> Ivermectin has a wide antiparasitic activity with long veterinary use [4]. When ivermectin's activity against *Onchocerca volvulus* was discovered, it was licensed for human use and was used in mass drug administration programs to control river blindness; it was administered to >80 million adults and children. The drug has proven to be safe. Doses up to 10 times the approved limit are well tolerated by healthy volunteers [5]. Adverse reactions are few and usually mild [6, 7]. Ivermectin is also used against other human parasites, including strongyloides and scabies.

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resource-poor communities?". Published in 2014, the year before the Nobel Prize in Physiology or Medicine was awarded for the discovery and development of ivermectin, this paper notes the following (Omura and Crump 2014):

> New uses for it are identified regularly, including possible antibacterial, antiviral, and anticancer potential. Hundreds of millions of people are taking ivermectin to combat various diseases and afflictions, and mass administration of ivermectin in polyparasitised poor communities around the world is increasingly recognised as a mechanism to easily and cost-effectively improve overall health and quality of life for everyone.

Despite the extensive safety record of ivermectin, the authors of the Quillette article suggest that it is a dangerous drug. Specifically, they argue that ivermectin a) causes testicular dysfunction, b) is a known teratogen, and c) has been linked to serious neurological adverse events. To these particular claims:

a. The paper that they cite for testicular dysfunction (in rats) begins: "Ivermectin, an acaricide and anthelmentic drug of the family of avermectins, produced by *Streptomyces avermitilis* cultures, is a well-tolerated drug with no side effects in mammals at pharmacological doses." In *combination* with another drug, verapamil, fertility and meiotic effects become an issue (El-Nahas and El-Ashmawy 2008).

b. The paper that they cite for the teratogenicity (ability to cause harm to the fetus during pregnancy) of ivermectin actually *fails* to find that result, even though it was the goal of the research to discover just that. The researchers did not declare ivermectin safe during pregnancy, but they couldn't find evidence that it wasn't safe. They conclude that "this study cannot draw evidence-based conclusions on whether or not there are deleterious effects of oral ivermectin during pregnancy." (Nicolas et al 2020). That said, we—Heying and Weinstein—would recommend avoiding exposure to any drug during pregnancy, unless absolutely required.

c. The paper they cite for evidence of "rare but serious neurological adverse events" is

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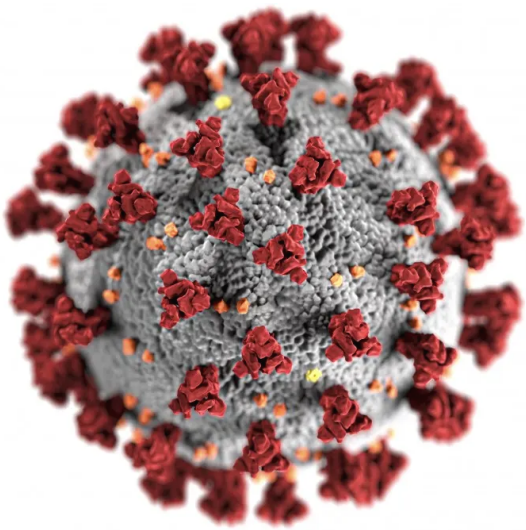
were compromised by concomitant infection or adverse interactions with other drugs, making it impossible to pin down whether it was ivermectin that caused the event (Chandler 2018).

In this massive review of available literature on the safety record of ivermectin, collected over six months in 2020-2021 with the explicit aim of conducting "an extensive analysis of ivermectin safety in human beings," the author— Jacques Descotes MD, PharmD, PhD, and professor emeritus of toxicology—concludes that "the safety profile of ivermectin has so far been excellent in the majority of treated human patients so that ivermectin human toxicity cannot be claimed to be a serious cause for concern."

The authors of the Quillette article are questioning the safety of ivermectin, but pushing the story that the Covid vaccines are inherently safe. Given the historical record that is available for each of these treatments their position seems backwards to us. We have an abundance of evidence with respect to the safety of ivermectin, but very little regarding the safety of novel Covid vaccines. This is a simple and unavoidable reality owing to the newness of the Covid vaccine technology, not an inherent flaw in the Covid vaccines themselves. Truth and clarity are important. Let's speak to vaccine safety next.



3. *Safety Record of Covid Vaccines*

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science, and to humanity:

"The evidence that mRNA-based COVID-19 vaccines are safe, and that they work, is about as solid as medical evidence gets. Sure, no one can *prove* that in 10 years' time, you won't suffer ill effects. But nor is there any reason to fear this."

They are clearly holding their conclusion about vaccines to a different standard than their conclusion about ivermectin. This is a chronic double standard seen broadly across the discussion of Covid treatments and preventive measures.

As we have been saying since before the novel coronavirus vaccines were rolled out, we truly hope that they are as miraculous and safe as the authorities would have us believe. But hope is no replacement for evidence. Here are three lines of evidence that suggest that the Covid vaccines are not as harmless as we are being told: a) assessment of deaths in VAERS, b) Bell's palsy, and c) myocarditis and pericarditis.

a. Assessment of deaths in VAERS

First, an assessment of deaths reported in the Vaccine Adverse Events Reporting System (VAERS) Database. Much has been written about the unreliability of VAERS, given both the ability of anyone to enter events into the system, and the clunky and difficult to use nature of the interface. As a result, the observation that there are far more deaths recorded in VAERS from Covid vaccines since their roll-out, than from all other vaccines combined over the last 30 years, has been down-played in the media, as well as by our own government. This is a mistake.

If we are to defeat Covid, protect the public, and maintain our ability to respond to future crises, we must know the truth. (It is true, for instance, that a significant fraction of deaths reported in VAERS appear to be coming from outside of the U.S., which explains at least some of the discrepancy between VAERS numbers and those reported by the CDC.) Undermining public trust has long term and unpredictable consequences. In the short term it is impossible to make informed and strategic decisions if you do not have information.

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of Covid vaccine death reports from VAERS. They found that at least 67% of those reports were from health service employees—reporting on behalf of patients—and a further 5% were from pharmaceutical employees. This suggests a certain level of rigor in VAERS reports. Further evidence that the adverse events recorded in VAERS are likely to be an undercount can be found in this report from 2010 (Lazarus *et al*), which found that "fewer than 1% of vaccine adverse events are reported."

For their analysis, McLachlan *et al* (2021) pulled the first 250 deaths reported after Covid vaccination from the VAERS database. Their central findings are these:

> In spite of the fact that only 11 (4%) present with a test-confirmed and current COVID-19 infection, all 250 people in this interim collection were reported as COVID-19 deaths. This means that all, even those who received one or more negative test results, are erroneously counted in the officially reported national COVID-19 death tally.

The researchers also found that, among these first 250 deaths after Covid vaccination that were reported in the VAERS database, the *only* patients in which a vaccine allergic reaction could be ruled out was among the 34 (14%) who were "already bedridden, at end of life, and expected to die anyway from a serious comorbid like lung cancer or were on palliative hospice care." Furthermore, they found that for 13 of the 250 deaths (5%), a vaccine allergic reaction was "indisputably the most likely direct cause for the symptoms and patient outcomes described."

And yet *none* of these first 250 deaths that occurred after Covid vaccination were recorded in VAERS as vaccine deaths. They were *all* recorded as Covid deaths. We simply must have better information. If these patterns are real, this is a serious problem and we all deserve to know the truth.

b. *Bell's palsy*:

Bell's palsy is a sudden onset weakness in or freezing of muscles on one side of the face. It is usually temporary. There were four cases of Bell's palsy reported during phase 2/3

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Document of the *Vaccines and Related Biological Products Advisory Committee Meeting* from December 10, 2020, sponsored by Pfizer and BioNTech and on the topic of their new vaccine, it was reported that:

> The observed frequency of reported Bell's palsy in the vaccine group is consistent with the expected background rate in the general population, and there is no clear basis upon which to conclude a causal relationship at this time…

It turns out, however, that this conclusion was wrong. The FDA document does not provide any justification—mathematical or otherwise—for its conclusion, but it was probably based on an erroneous use of *annual* estimates of rates of Bell's palsy, although the four cases of Bell's palsy that occurred all happened within 48 days of vaccination.

Researchers publishing in The Lancet on February 24, 2021 revealed that there had been an error:

> the observed incidence of Bell's palsy in the vaccine arms is between 3.5-times and 7-times higher than would be expected in the general population. This finding signals a potential safety phenomenon and suggests inaccurate reporting of basic epidemiological context to the public.

And followed up, again in The Lancet, on June 7, 2021:

> The available data remain consistent with a more than threefold increase in risk for Bell's palsy within 1 month of a second vaccine dose.

Reuters' fact check, which was released on December 10, 2020, the same day as the FDA briefing document, reads in part, pulling directly from the FDA document, that "the frequency of Bell's Palsy in the vaccine group is 'consistent with the expected background rate in the general population'."

As of July 30, 2021, Reuters has not updated their fact check to reflect reality. Indeed, on June 28, 2021, they put out a new fact check that includes the line, "COVID-19, not Pfizer's vaccine, tied to Bell's palsy."

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c. *Myocarditis and pericarditis*:

Myocarditis (inflammation of the heart muscle) and pericarditis (inflammation of the pericardium, the membrane outside of the heart) have been reported after mRNA vaccination in the U.S., particularly in young men. Both conditions tend to be caused by the immune system having been triggered to create inflammation.

We are assured by the CDC that vaccination is still the best option even though 1) these conditions are particularly prone to affect young men post-vaccination, 2) in the absence of vaccination such conditions nearly never affect young people, and 3) young people are at low risk for bad outcomes from Covid to begin with.

The CDC does grant, however, that "the balance of benefits and risks varied by age and sex because cases of myocarditis were primarily identified among males aged <30 years, and the risks of poor outcomes related to COVID-19 increase with age." In plainer English, they are acknowledging that the risks from the vaccines are higher the younger you are, and that the risks from Covid are lower the younger you are.

Given all that we do not know—for many reasons, included among them that symptoms have been under- or incorrectly reported, and corrections to the official record don't make it back to the people making decisions—it would seem foolish to employ a one-size-fits-all strategy on vaccine roll-out, when some demographic groups are simultaneously at higher risks from the vaccines, and lower risks from Covid (especially if they have access to an effective prophylactic).

Bell's palsy and myocarditis are not the only symptoms that have been noted post-vaccination. The OpenVAERS website is easier to use than VAERS, but mirrors the data from VAERS, and reports of anaphylaxis, seizures, heart attacks, reproductive problems, blood clots and strokes, pain, mobility problems, rashes, tinnitus, dizziness, confusion and memory issues post-vaccination are, unfortunately, abundant.

Furthermore, given news that the CDC won't be collecting some kinds of data anymore

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analyses. What all of this means for certain is this: we need better data. In the meantime, we should act with caution and take these signs seriously.

4. *Effectiveness of Covid Vaccines*

We are assured that the novel coronavirus vaccines are highly effective. Indeed, an oft-cited study looking at the effectiveness of the two-dose Pfizer vaccine in Israel purports to find extremely high effectiveness against both infections and, in breakthrough cases, in reducing hospitalizations, severe disease, and death (Haas *et al* 2021). But this analysis published on Substack points out that the math done by Haas *et al* to arrive at their conclusions is in fact the wrong math.

It does seem to be true that the risk of *infection* is far lower in vaccinated than in unvaccinated individuals. But for people who are both vaccinated *and* infected, the correct math does not reveal a reduction in deaths, compared to those who are unvaccinated, unless they are old [1]. On one hand, this is good news: the elderly are the most at risk from Covid, and also have the least to lose, in terms of life expectancy, should the vaccine prove less than perfectly safe. That the vaccine appears to do the elderly the most good makes getting vaccinated a very good choice for them. And the vaccine does appear to protect against infection across age classes (although the protection wanes with each passing month). But the younger you are, the less at risk from Covid you are, and the less benefit the vaccine offers. This is unfortunate, but true, and pretending otherwise serves neither individuals nor populations who are trying to remain healthy.

Furthermore, there is the issue of the selective pressures exerted by vaccinating a population during a pandemic. Geert Vanden Bossche has been sounding the alarm on this for many months (see e.g. this recent post, and his appearance on DarkHorse in April). The "imperfect vaccine hypothesis" is that non-sterilizing vaccines—that is,

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are predicted to create the perfect conditions for resistance to evolve to those vaccines. This is a particular risk during a pandemic. (And this prediction provides yet another reason that it is imperative to seek out alternative prophylactic measures as a barrier to such evolved resistance.) We have spoken about this several times on DarkHorse.

The "imperfect vaccine hypothesis" has been supported by mathematical models several times over, and in 2015, Read et al found experimental evidence of it in chickens. When chickens were immunized against Marek's disease with imperfect vaccines, the net effect was to "vastly increase the amount of virus shed by virulent strains into the environment." As the title of the Read *et al* paper simply and succinctly observes: "Imperfect Vaccination Can Enhance the Transmission of Highly Virulent Pathogens."

In unfortunate service of the prediction that non-sterilizing vaccines promote the evolution of new variants, here is a long-ish quote from the exhaustively researched "Rounding the Earth" newsletter, from July 14:

> Let us examine the specifics of the variants that have spread and caused trouble.
>
> - The Alpha variant emerged in the UK in October, which was when Oxford-AstraZeneca was holding vaccine trials there.
> - The Beta variant emerged in South Africa, and was first detected in December, 2020, at the tail end of trial periods for both Oxford-AstraZeneca and Pfizer vaccines. This variant carries three mutations in the spike protein.
> - The Gamma variant was first detected in Japan, but soon after in Brazil, making the origin a little harder to determine. But since Japan has had far lower viral spread than Brazil, it makes the most sense that Brazil was the source. Both Oxford-AstraZeneca and Pfizer trialed their vaccines in Brazil.
> - The Delta variant was first detected in India in October, 2020. India hosted numerous vaccine trials including one for Oxford-AstraZeneca and one for Covishield.

Vaccines that are sterilizing are *not* predicted to create the selective pressure that results in increased pathogenicity (once individual immunity is achieved). Nor are

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and they *are* in widespread use. Variants are on the rise. The media would have you believe that this is due to the persistence of unvaccinated individuals in the population. While unvaccinated individuals play a role in this dynamic, they are logically neither necessary nor sufficient. Theoretical predictions, experimental results, and real-world observations of where and when the variants have emerged suggest that, rather, it is the non-sterilizing vaccines and our current approach to vaccination that are responsible for the rise in variants.

5. *Unhelpful Dichotomies: Vaccinated vs. Unvaccinated*

In order to drive SARS-CoV2 to extinction, we need a very high proportion of the population to be protected from the virus, such that it cannot spread. We need herd immunity. As defined by the WHO, herd immunity is achieved when a population is immune "either through vaccination or immunity developed through previous infection." Thus, both those vaccinated, and those with natural immunity due to previous infection, contribute to herd immunity.

In many discussions of how to end the pandemic, however—or just of how to slow the spread locally—what is invoked is the unhelpful dichotomy of *vaccinated vs. unvaccinated*. Restaurants and stores, for instance, increasingly tell us: if you're vaccinated, do as you please; if you're not, wear a mask. And the CDC insists that everyone, regardless of whether or not they've had Covid, should get vaccinated, citing unspecified "experts" as the source of their recommendation.

The correct comparison ought not be "vaccinated vs unvaccinated" but rather "protected from Covid, vs unprotected from Covid." In the group that ought be considered "protected," there are, we argue, three distinct groups:

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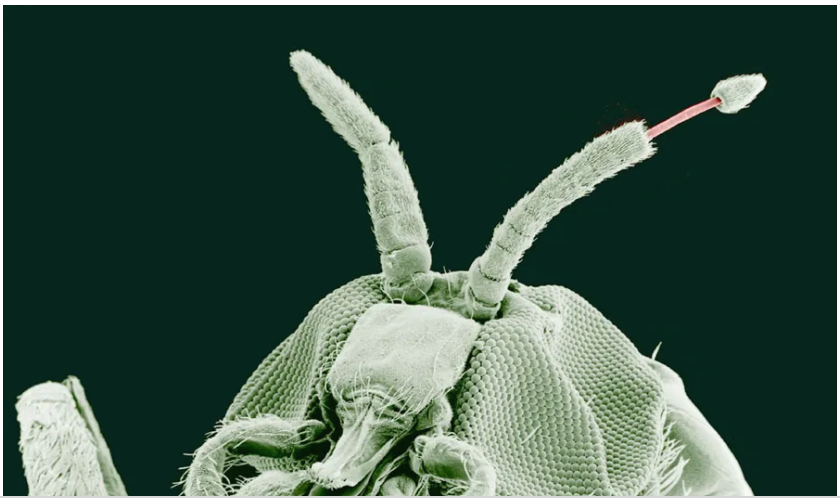
3. *those on other effective prophylaxis, such as ivermectin.*

Even if you are not compelled by the evidence for the effectiveness of ivermectin as prophylaxis against Covid, you are left with those who have natural immunity, as a result of the unfortunate fact of having had the disease.

Two recent papers report that natural immunity is gained from having had Covid. Cohen *et al* 2021 finds "durable and broad immune memory" for eight months post-infection (after which there is no evidence that immunity dissipates; eight months was simply the time limit of the study). Ivanova et al 2021 (still in preprint) compared the immunity gained from infection to that gained from mRNA vaccination. Across several different indicators of robust immune response (e.g. both increased numbers and activity of T, NK, and γδ T cells), they found that infection with Covid provided far superior protection to being vaccinated with a mRNA vaccine.

Given this evidence, why are those who have recovered from Covid being strongly encouraged to get vaccinations which have elevated risks and no benefit to them? We posit that it is due to a simplistic, single-minded focus on one and only one solution to the pandemic: mass vaccination. This position permits no nuance, and allows no evidence. It cannot be defended from either an individual health perspective, or a public health perspective. A defensible policy would at least exclude naturally immune people from the recommendation to get vaccinated, and would make use of alternative prophylactic treatments for people beyond the reach of the vaccines.



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6. *Ivermectin Messaging: Science or Politics?*

Ivermectin has been in use for decades, given to hundreds of millions of people worldwide, for a wide variety of conditions. It is not a "veterinary deworming drug" as some claiming the mantle of science would have you believe. Such people are engaged in propaganda, not science, and theirs is a rhetorical trick to make you want to avoid ivermectin.

The prospect of an alternative to vaccination—that is, a safe and effective prophylaxis—should be encouraging to people who rightly understand what a terrible affliction Covid is. This is a drug that has promise not only as prophylaxis but also as treatment—something that vaccinated people with breakthrough cases should be interested in as well. Why, we must ask, are so many people so opposed?

In 2012, ivermectin was found to be a "highly potent inhibitor" of replication of the yellow fever virus. Eight years on, a systematic review found that ivermectin was effective against a wide range of RNA viruses, including but not limited to West Nile, dengue, zika, and tick-borne encephalitis. Many of these diseases are on the upsurge, including West Nile in the United States.

At the moment, though, using it for such diseases would be off-label use, and thus dangerous, we are strangely told. Off-label use of drugs with established safety records is a long-standing practice. Why is there a campaign against the use of ivermectin in the face of a global pandemic? One answer can be found in this statement from Malaysia's National Pharmaceutical Regulatory Agency: "any self-medicating or off-label use of Ivermectin could be dangerous and it could distract from the National Covid-19 Immunisation Program."

It is within the realm of possibility that the efficacy of ivermectin as prophylaxis is being shut down not due to science, but to politics.

Whatever the reason, the world seems to have been convinced that a "vaccine only" strategy is the only way through this pandemic, even though no plan that plausibly links

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believe that ivermectin is an extremely promising candidate for broadening our approach to Covid, getting hung up on arguments about one drug or another is a distraction. The essential point is that we must vigorously seek all additional tools to fight SARS-CoV2, including ivermectin.

7. *Bad numbers and flawed analysis: Fact checking the critics*

Covid is a scourge of a disease, sparing no demographic completely. That said, it has long been recognized in both the scientific literature, and the press, that some people are at more risk than others. Old people are particularly susceptible. People with comorbidities are far more likely to get sick and die than those without (Kompaniyets et al 2021). And children, while not immune, have been, thankfully, largely spared.

This disease needs no help to be frightening. So it is concerning to see what seems to be fear-mongering to scare parents into believing that it is a far greater threat to their children than it actually is. Evidence of bad numbers and flawed analysis in the Quillette article can be found in a number of places. Here is but one example from the original posting of the article:

> A retrospective cohort study published recently in *Nature* found that among 12,306 lab-confirmed pediatric COVID-19 patients in the United States, almost 18 percent needed critical care services, and 4.1 percent required mechanical ventilation.

Eighteen percent of pediatric cases of Covid require critical care services?! Wow. That number certainly made us do a double-take. And of course it is not true. The authors misunderstood the Nature article that they cited for this claim. After commenters on the Quillette article noted that this was flat out wrong, the language was changed to this:

> A retrospective cohort study published recently in *Nature* found that among 12,306

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> the hospitalisation frequency was 5.3 percent, with 17.6 percent needing critical care services and 4.1 percent requiring mechanical ventilation.

This is certainly more accurate. But it's still vague and misleading. What the *Nature* article in question actually finds is that among pediatric Covid patients, 5.3% required hospitalization, *of which* 17.6% needed critical care services, and *of which* 4.1% required mechanical ventilation. For those new to math, that means that 5.3 * (multiplied by) 17.6 = 0.9% of pediatric patients required critical care services, and 5.3 * 4.1 = 0.2% of pediatric patients required mechanical ventilation. Even a single child in such dire straits is a tragedy, but the number of children experiencing these awful outcomes is ~20 times lower than what the Quillette authors originally reported.

The Quillette article by Berlinski and Deigen, and the Sam Harris podcast with Eric Topol, are riddled throughout with errors, oscillating between strawman arguments and outright misrepresentations. DarkHorse guest Steve Kirsch isn't a doctor (as claimed on the Making Sense podcast); neither Kirsch nor Dr. Malone are with the Front Line Covid-19 Critical Care Alliance (as claimed in Quillette); the aforementioned FLCCC is not the same as "America's Frontline Doctors" (Making Sense), and none of those mentioned have claimed that people are "secretly dropping like flies" from the vaccines (Quillette). Bret never said that a person with a headache "is having mRNA go into their brain" (Making Sense); nor did he host an emergency podcast (Quillette); nor did he or his guests claim that ivermectin is 99% effective in treating Covid (Quillette).

There are many more basic errors of fact, but you get the point. Neither of these critiques—that from Quillette or Making Sense—holds up to either journalistic or scientific scrutiny.

We're not going to fisk these texts, in part because Alexandros Marinos already did a fantastic job of doing just that on twitter (Quillette thread; Making Sense thread). We did not know Marinos before he wrote these threads; he and Eva Tallaksen have since started a project called Better Skeptics, which they call a "prototype for collective sense-making." Their first project is aimed at evaluating the veracity of the four DarkHorse podcasts most relevant to the topics covered here. We applaud the effort to bring better

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journalistic perspective, we all need better skeptics.

Lastly

What is most important is this: There is a deadly virus circulating. Many have died, and many more probably will. It is in our collective interest to extinguish the virus. We must not allow it to become endemic.

What is the best way to accomplish this? Some people, including the authors of the original Quillette article, see one and only one way forward: vaccination with the current crop of Covid vaccines. Other people, including ourselves, see a multi-pronged approach as essential:

1. vaccinations for those who can and will have them,
2. recognition of the natural immunity of those who have had Covid, and
3. the global use of repurposed drugs, including ivermectin, as prophylaxis by people not in categories one or two.

We were asked, in a recent livestreamed Q&A, to "steelman the case against ivermectin." We focused on steelmanning the case against the use of ivermectin as a Covid prophylaxis, clipped here. Medicinal prophylaxis is not a perfect solution. Among other concerns, it requires on-going compliance. The flip side of that, however, is that it is reversible, which is not true of vaccines. All else being equal, though, vaccines are a better solution, if they are both effective (personally and epidemiologically) and sufficiently safe.

But Pfizer now indicates that six months after vaccination, you might need another one. These vaccines are not sterilizing, and so potentially create selective pressure for

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the safety concerns for individuals. Yet the authors of the Quillette article would have you believe that our discussions of Covid vaccine safety and repurposed drugs such as ivermectin are, in and of themselves, a threat to global health. We posit that, once again, they have that backwards.

We are all in this together. Demonizing others, be they vaccinated or unvaccinated, is not a solution. The current vaccines cannot end the pandemic, and it is time to advance a plan that conceivably can. This has been our motivation from the beginning. We can and should all look to our better angels, and move forward with the dignity and resolve that those angels offer us.

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1 This sentence originally read, "But if a person is both vaccinated *and* infected, the correct math reveals no reduction in deaths, compared to being unvaccinated, unless they are old." The language of the original, while ambiguous, can be interpreted as suggesting a clear, directional signal that is not in the linked article. Once again, see the linked article for a deep dive into the weeds on this.

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215 Comments

Write a comment...

KATHERINE VIEHA Jul 31, 2021

You both are very nuanced sensible people that never claim anything with arrogant certainty but instead explore the questions we all have and cannot articulate properly. You are much appreciated. Keep up the good fight. It's absolutely heartbreaking to watch the ad hominem attacks, now even from those that should champion your inquiry in a world where you stand

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17 replies

Elizabeth Hanson Jul 30, 2021

Bravo! This needs to be read by everyone! Very clear and balanced... Well thought out! Now go outside bare foot and have a great weekend! You deserve an applause for this!

LIKE (24) REPLY SHARE

213 more comments...

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